**Social Effects of Aerospace Technology**

**Or**

***“Why Go To The Moon”
“ Who Needs Aero-Space, Why Not Spend Our Money on Ecology and Welfare Programs”
April 1971, TGK – Engineering Major, Hofstra University***

**INTRODUCTION**( copywrite – TG Kapela)

 Long before man invented the word, technology improved his way of life, both socially and economically. The slow dawning rational realization, and then mastery, of the wheel, fire, and how to extract iron from rocks are classic examples. Note this statement by Alvin Toffler , *“Behind such prodigious economic facts lies that great, growling engine of change – technology. This is not to say that technology is the only source of change in society. Social upheavals can be touched off by a change in the chemical composition of the atmosphere, by alterations in climate, by changes in fertility and many other factors. Yet, technology is indisputably a major force behind the accelerative thrust. “ (1)*Therefore, obviously, technology is a major force in social change.

 Man’s ingenuity constantly developed better ways to defend his own and provide food. He advanced from fingernails to the rock, then to rock plus stick to arrow and then, up to now, the firearm. There are many more examples of technological improvements affecting our lives socially, but in this paper I am primarily interested in today’s world of Aero-Space Technology.

 What is technology? According to Webster’s Twentieth Century Dictionary, technology is “the science or systematic knowledge of industrial arts, as spinning, weaving, dyeing, metallurgy, brewing and the like.” Aero means ”any form of airship” . Space is “extension considered in it’s own nature without regard to anything eternal, or that which always remains the same and is infinite and immovable”. Therefore we may say that Aero-Space Technology is “the science . . . and the like” as pertains to “any form of airship” which is the “extension considered …..is infinite and immovable “. Simplifying this definition, we may say that Aero-Space Technology is the investigation of everything from “soup to nuts” in the development of systematic knowledge of space and airships. Broadening the interpretation somewhat, it is possible to make this definition of Aero-Space Technology (A-ST) mean man’s continuous way of trying to improve himself by investigation and accidental discovery, because he cannot do it otherwise for (now) economic reasons, or reasons of inability to cope with a problem.

 Today’s news is wrought with examples of man’s vain attempts to cope with his ancient self -created problems; welfare, political corruption, wars etc. How is it then that A-ST can be termed man’s latest slogan in his attempt to solve his problems?

 Man’s seemingly inbred attempt, from the year one, to venture into the heavens to seek the answer to Who, Where, Why and how is man, may be the explanation. In ‘ Pursuit of an Ancient Vision ‘(2), the Life Science Library shows Icarus as an astronaut of Greek mythology trying to fly to the Sun; Lucian of the second century AD and his book ‘True History’ (3), a story of war between the moon and sun people, and others: Leonard DaVinci, Johannes Kapler, and Jules Verne. (4). From ‘The Scientist’ , mans quest is explained/examined in the introduction by Frederick Seitz, President of the National Academy of Sciences. (5)

 All of these references cite man looking to the heavens for an answer. Despite claims that man has the technological ability to cope with poverty and ecology, he has barely scratched the surface. Cost, physical limitations, politics, the general public’s quest for the cheapest product possible without regard for the consequence’s, among other factors, inhibits all out attacks on these problems. Arriving at reasonable solutions may be found by continuing to look for Who we are, Why we are here, and Where we are. The tag Aero-Space Technology is simply man using a different word to express his efforts when looking at the heavens for an answer to these problems.

**P a r t 1**

**The Accidents and Economics of Aero-Space Technology**

 The subject of technology itself is very broad; but today it is possible to say that almost 70 – 75% of all technological improvements in the past 20 years are spin-offs from Aero-Space Technology, i.e., were it not for the investment in A-ST, they would not exist. Trace most of our improvements; a transporter for live hearts, full time electronic patient life system monitoring, the Mobile Intensive Care Operating Table, the Operating Room console (6), the pacemaker (7), hand held color television cameras (8), and the computer. The computer was developed mainly by Aircraft Technology where the need to handle a large volume of complex problems for control of rockets and missiles required more than just human control. But, probably the item which is of most importance, and is having the greatest direct impact on our society is the management system developed for the Apollo Program. To state Alvin Toffler … *“Project organization is widespread in the aerospace industries ……while this form of organization is wildly identified with aerospace companies, it is increasingly employed in more traditional industries as well” (9),* Or ….”…*The national space program represents a successful management approach to accomplish the almost impossible. The tack of going to the moon ….. was done without a military objective and it was done withing cost and schedule set for it ten years earlier. These management technologies are available …” (10).* This is a very brief description of Improvements from aerospace technologies. But, what has this to do with accidents? If you traced these and other improvements, you would probably find that the resulting technological gains were nowhere near a solution to the original problem investigated, and any resemblance would be hazy and non-relatable.

*( Have to add an additional editors note here: About the time of this writing, an accidental discovery by an electronics engineer testing Radar systems on Long Island. He happened to walk in front of the antenna dish while the system was active. He discovered the chocolate bar in his shirt melted, which resulted in the Micro-wave ) edit 2021*

 An idea of why this is so may be answered in part *by “What will inspire an idea, no scientist is rash enough to predict “ (11)* . How could anyone have known the things that would evolve from Project Apollo?

 What of accidents and economics that, for instance, gave us Corning Ware? “What are the benefits of the space program? You have all heard of sharper X-Ray pictures, the longer lasting paint, the faster dentist drills, small TV cameras, new medical instruments and far better ice cream freezers. These are comparatively trivial and insignificant outputs of the programs and certainly are not in themselves ways to justify the expense and energy we have undertaken” (12). Mr. Clayton is saying that if not for aerospace, these developments may have been a long time in coming because we could not justify spending the millions needed to develop these items separately, if indeed, we had been motivated to see a need to create them. Butt, by accidents*, “A happening, an event that takes place without one’s foresight or expectations “(13)* , we improve our daily lives the cheapest way possible; i.e. somebody else paid to develop our most modern cooking/eating ware. Additionally, these “accidents” change the characteristics, somehow, of every social institution in business, education, religion, family and politics.

 To put forth ‘Why Aero-Space Technology?’ in another light, what are the solutions other than the Aero-Space Industrial Complex? Sociologically, is there another way to solve our problems other than socialistically funded profit/knowledge motivated investigators/creators??

**P a r t 2**

**--The Most Productive and Comparatively Least Corrupt Welfare Organization --
The Aero-Space Industrial Complex**

The area of investigation here is quite large, therefore items of extreme controversy are passed over because, depending on your outlook, the reader, like all persons, will have some bias and argument. As a basis for this paper, I have quoted or used heavily the expressions of those in the industry, who, by no surprise, mostly relate my own feelings. Though complete agreement with others is not often the case, the basics are in agreement. Related below is a quote which I feel is close to the crux of it all. ( edit note from my professor – a bit long – but I could not improve upon the relevant quote )

***( begin quote Of Charles M Kears ) . . . . .***

“………Critics of our current way of life level two broad charges against science and technology. The first implies that some unholy alliance loosely decried as the military-industrial complex exists which diverts the energies of the country to its defense at the expense of the common good.

The second charge is that the very prosperity of the country depends upon a technologically based system of industry and agriculture which by its nature deteriorates the environment. Further, they say, any attempt to change this situation will have serious social and economic consequences.

I am principally interested in the second of these charges today. But, before going into it, I must state my own conviction clearly and unequivocally with regard to technology and defense.

History has shown repeatedly and, in fact, inevitably that the nation which permits itself to become weak has been overrun and swallowed by those competitive groups which have seen to their defensive capabilities, which have kept their armor polished and their weapons modernized.

Whether we like it or not, defense and technology are inexorably related. In the Second World War, the Polish Calvary – dedicated, daring and heroic though it was -- was no match for the German Panzer.

We are confronted in the world today with conflicting ideologies. Unless we keep ourselves strong, they will replace our values with theirs.

In our country ,,,,,,,, we have created a body of technological expertise and teams of well-trained specialists which together make us able to defend our way of life against any outside aggressor. And, the Aerospace industry is the largest single bank of engineers and scientists in the country.

……. Certainly, the pollution of our atmosphere, our water and landscape cannot be permitted to persist. Obviously, something must be done about the congestion of our roadways and every effort must be made to reduce the noise level which surrounds us.

If we stand back and observe these problems, we can see they arise from increasing population density and affluence as much as anything else. As Walt Kelly’s cartoon strip character Pogo says, “ We Have Met The Enemy and He Is Us “.

There is a major question though, as to which way to go. Increasingly there are voices being heard which may say: Let’s suppress technology and let’s suppress those people who create new technology. ….. Constantinos Doxiadis was asked : Can we not save the situation by stopping the growth of human settlement? To which he answered: “First we must close all of our research institutes and universities and in addition kill our trained engineers, because if we let them survive, they will create new institutes, go ahead with research and develop new technology.” Today we are aware of social and other human problems, and we solve those problems in a better way now than in the past …….

Consider if you will, that the single most important characteristic which has brought man to his unique position among the animals has been his ability to use the natural resources around him to his own advantage…..

In spite of the sneers of some, we all bathe generously in the benefits – benefits which are the envy, and the ultimate objective of the rest of the world.

I won’t stand here today and claim that I have the solutions to our many problems, or that these solutions will all come from the aerospace industry. What I would like to do, however, is to suggest that our aerospace industry has been a significant contributor to the better quality of our life, and that it can make even greater contributions in the times ahead”” ………….

**( end quote of Charles M Kearns) ( 14 )**

This referenced article sets many ground rules:: our U.S. society has chosen to be leaders: we entered two world wars to “save humanity” ( ourselves ) : and we are determined to preserve our way of life, and perhaps allow others less fortunate to have the same choice. Without this attitude would not this country be overrun for its wealth of natural resources, strategic positional value and size and temperate climate? Those who feel this is not so, should read history and verify Mr. Kearns statement “ history has shown…..” above.

What makes our way of life best or at least better? The answer could be in why we vote for our political representatives or *“… for the students now pressuring higher education to de-standardize, to move toward super-industrial diversity, will win their battle” (15)*

*“We see here therefore, a major cultural force in society – education – being pushed to diversify its output, exactly as the economy is doing. And here, exactly as in the realm of material production, the new technology ( Aero-Space T) , rather than fostering standardization, carries us toward super-industrial diversity” (16)*

*“But increasingly, it is the technologically produced environment that matters for the individual.” (17)*

*“Thus, despite all the anti-technological rhetoric of the Elluls and Fromns, the Mumfords and the Marcuses, it is precisely the super-industrial society, the most advanced technological society ever, that extends the range of freedom” (18)*

All of these statements above prove that deep down, everyone wants all that Aero-Space technology has to offer. This , therefore, always leads us to the economics of the situation, one way or the other.

*( here I must include my Professors comment : : : Prof. Davis - “ Your preceding statements don’t appear to support this statement. “)*

Our society is geared to be socio/capitalistic, and the system has proved itself basically sound for many years. A small comparison may be made here, based on an article in the New York Times, April 8th, 1971, about a supposedly socialistic geographic society which is spending as much as one-forth of collected revenues on the military. There does not seem to be any records as to how much additional is being spent on science and space, though. According to J.S. Foster, Defense Dept., director of Research and Engineering, before 1968, the Russians spent all of their research funding growth on space, and since that time they have allocated their entire budget to the military. In comparison, during the 1972 fiscal period, the USSR will be spending 40-50% more in equivalent effort to military research. (19) Almost every week articles appear about the Soviet Union turning toward the reward system for work output.

The US will spend77.2 billion for HEW this year, more than the total defense and space budgets combined – 76.8 billion. (20) Economically and socially, we are losing.

*2022 - Editors Note :: Little is advertised about the Russian co-operation as related to space programs. The demise of our Shuttle Program required that our program depended upon the Russian rockets and manning of the International Space Station. In addition, little mention is made of the Chinese Station and progress.*

Comparing the benefits of the Aero-Space Industrial complex to welfare, the return in welfare is spent on paying someone to live where no reciprocal benefit is derived. HEW money is spent on corrupt and useless programs which have questionable benefits to the recipients. “Thus,” a leading urbanologist writes with unconcealed disgust, *“at a cost of more than 3 Billion dollars, the Urban Renewal Agency has succeeded in materially reducing the supply of low cost housing in American Cities” (21)*

*“Why do welfare programs today often cripple rather than help their clients?” (22)*

In the current wave of layoffs in the Aero-Space Industry, 42 million was allotted to help *“train engineers and scientists to other jobs”. (23)* In reading the article, it becomes apparent that most of the money will be spent employing politicians, and the benefits to the laid off engineer are hazy. Districts all over New York, (24) California (25) and Seattle, Washington (26) are setting up massive programs to give welfare aid to these people.

As can be seen here, we are trying to set up the most expensive welfare state in known history while destroying the most beneficial and productive society going -- the Aerospace Industry.

Consider who pays the Aero-Space industry – the same taxes that pay welfare. The industry creates jobs for all people, skilled and un-skilled, and is the least biased by race, creed or color because of talent and legal considerations. In the meantime, the product produced improves and aids every other industry.

This, therefore, makes the industry a recipient of public assistance. The public pays the industry to come up with the main product and the sideline benefits derived. In the process, the public employs the butcher, baker and the candle-stick maker. If you followed this trend, you would probably conclude that the Aero-Space Industrial complex is what is responsible for making your job possible. All of this can be equated to our society; the capitalistic orientation it bears and how this works.

In our capitalistic society, money is of most importance because it is a means we use to reward people for their efforts. From the year one, you get paid for your output; no output, no eat. The Indians banished from their tribes those who would not work, hunt or whatever. In a cast system like “Indian Village” (27), payment of some kind was given for services received. It is no surprise that the Honorable Mayor Lindsay of New York City has proposed a “No Work, No Eat” welfare program to combat you and I from paying people who have not contributed and will not contribute through false racial, political or physical excuses. Extenuating circumstances where a contribution has been made are acceptable to most persons. Here, as in most societies, support of such persons is given willingly ( Social Security, Medicare, Pensions, Unemployment Insurance ) as long as the recipient abides by the rules and does not take advantage. This is a social problem, taking advantage.

The problem does not exist to this great extent in a controlled Aero-Space Industrial Complex. Unemployment during the height of the Apollo program was at its lowest in history. ( The Government spent 38 billion dollars ( it cost you five cents/day) since 1961 for space programs and 340 billion for health and welfare. Are we giving health and welfare social programs a fair share of the Federal Budget? We could close NASA, let Cape Kennedy go back to a jungle, terminate the employment of all aerospace engineers and scientists and save three billion dollars; then perhaps spend 80 billion next year on social programs. Is the countries interest served??) (28).

Justification of the Aero-Space Industrial Complex is difficult when charges of corruption, lies etc., are possibly justified against them. True, it seems lately they are just as selfish as welfare and they are trying to “take advantage”. There are many reasons for this happening, but they are beyond the scope of this paper. My purpose here is to introduce a possible solution to the industry supposed corruption and yet prevent our reverting to the alternative.

But, before expanding upon possible solutions, look at the economics in another light ………

Why doesn’t the Aero-Space Industry tackle our environmental and social problems?

Business, the corporate individual, will not and cannot venture into something which is not profitable, regardless of how socially inclined they are, anymore than the private individual, for then they will no longer be able to exist. There is no money to be made in ecology, mass transportation, or the tackling of social problems if nobody will foot the development / production bill. Besides, the corruption in these areas previously publicly documented for the past three years in the towns of Babylon, Islip and Oyster Bay, New York; have had their sewage system programs defeated by the voting public because they “cost too much”. Mass Transit suffers from the Highway lobby. (29)

Then, there is the nature of man himself, the profit motive incentive. Common man does not seem to want to pay to have ecological problems solved. If you had a choice between buying a pollution free, almost totally safe auto, or a cheaper, nicer looking, economical one; which one would most persons buy? In actuality, the cheaper-nicer looking one would win and the sweet children and good old boys and little old ladies would merrily roll along, rolling down their windows to fling garbage onto the landscape.

In summation of this part, a brief look at the situation in Europe today is required.

On 23 Feb. 1970, Aviation Week and Space Technology ran an editorial on “Europe’s Space Dilemma”. They referenced their own special report of 4 July 1964 where “Public enthusiasm was high, government support was strong and an atmosphere of promise prevailed.” For the technological advancement of Europe – notably England. Europe seemed to be on the verge of realizing the alternatives and started to develop a sensible Aero-Space Technological plan. The surprise came a few years later, as the 1970 article goes on to explain, when nationalistic bickering’s wasted money on false starts and indecisions all but destroyed possibilities of Europe advancing themselves. In all of Europe, England stands out. I am sure everyone knows the economic plight of Britain; cancelled Aero-Space programs with increased welfare, devaluation of the pound, strikes for outlandish pay raises etc., lead to her downfall.

The ”Brain Drain” ;; people in the Aero-Space field fleeing their dying country to a place where there is a need for them. These same people who are seeing their own country waddle in economic and social problems are now fearful that they may have to return there because they have not yet reached a point in this country where they could live on welfare. Meanwhile, these countries and Asians are at our back door, knocking – asking to hitch a ride on our “boosters”.

The expressions of disillusionment by the English engineers in this country are referenced by the writers personal contact with these persons. One such person who was a supervisor in the same department as the writer , and was a personnel acquaintance, expressed these feelings to the New York Times ( Date unknown ) about 7 months ago. He was again a victim of the current hysteria, “ Why Go To The Moon “.

A humorous (?) end to these comments may be a poem in Letters to the Editor, Aviation Week and Space Technology, 5 April 1971.

Says Don Mc Allister of Rolling Hills Estates, California --------

There once was a Welfare State

That engaged in extended debate

All Things technological ( not ecological )

Suffered a dire fate

Then, one day when the wheel stopped running

And the lights went out for good

They called for a man to fix them

And found that nobody could.

**PART I I I**

**Fear ! Why Go To The Moon !!!**

Seeing why our alternative solution to Aero-Space Technology is not too promising, it is now proper to find out what the problem really is. But, the problem also seems to mix with the answer that this technology could be our way to find an answer. Therefore, the presentation of a way to solve welfare and ecology, in part, along the intermixing of why this fear exists may be in order.

There are many scientific reasons to “go to the moon” which will not be discussed here. The point is that despite all the rhetoric by ecologists and sociologists, there are crucial goals in this endeavor. The unknown, unstudied effects of a technology of this type might be our solution. But, there is a true and present danger in being fanatical either way as seen in Alvin Toffler’s “Future Shock*”. There was monumental over-reaction here to the orbiting of Sputnik 1 by the Soviets, which caused us to re-examine our educational system, national priorities and attitudes toward science. (30)* We had been lulled into a false sense of security, then when another nation bettered us, we panicked*. While we set up our national priorities and decided it was worth while to defend ourselves and also go to the moon, our ever present problems of beer bottles littering the ground around the hot dog stand, people gasping for air since times before WW II and oil pumps desecrating our seashores was still, as always, a threatening problem. (30).*

 But, we landed on the moon and something happened.

“ I was impressed with something Mr. D.P. Moynihan recently said in his farewell address to the administration. *“The American people are particularly able to skip their attention from one major problem to another very quickly and in the process lose sight of long-term priorities.”*  Just yesterday space exploration was a major concern but today it is out of vogue.” (31)

Mr. Moynihan was on to something here which I term as fear. Short sightedness, a growing urge toward religious fanaticies, cries of self-destruction, etc. These are all symptoms of what Alvin Toffler cares to call “Future Shock” *. “ The parallel term ‘culture shock’ has already begun to creep into the popular vocabulary. Culture Shock is the effect that immersion in a strange culture has on the unprepared visitor ….Future Shock …. Unless intelligent steps are taken to combat it, millions of human beings will find themselves increasingly disoriented, progressively incompetent to deal rationally with their environments. “(32)*

*“ Technology today has increased the pace of life to such an extent that persons cannot understand or cope with it. Our educational system is seriously lacking in this respect in that it does not prepare the younger generation for the future.” (33)*

But, perhaps the most outstanding statements in summary of the effects of technology are the following:::

*“It is significant that a slogan scrawled on a wall by striking students in Paris called for ‘death to the technocrats’ (34)”*. And *“One response to the loss of control, for example, is a revulsion against intelligence. Science first gave man a sense of mastery over his environment, and hence the future. By making the future seem malleable, …..it shatters the opiate religions that preached passivity and mysticism. Today, mounting evidence that our society is out of control breeds disillusionment with science. In consequence, we witness a garish revival of mysticism. Suddenly astrology is the rage. Zen, yoga, seances and witchcraft became popular pastimes …..We are told it is more important to feel than to think as though there were a contradiction between them “ (35)*

Looking at today’s news, all of this seems to tell our story. But there may also be an underlying reason for what Toffler says is a cause. Hopelessness, a feeling that we are going to be crushed in that growing engine which is becoming our enemy. Previous mention was made of this cause, corruption in and around Aero-Space.

The Aerospace Industrial complex problems, regardless of the reasons which would be the subject of a book, the growing empires, false claims of vehicle capabilities, outright lies, misguided endeavors and the feeling that, being in a depressed area or that the area will become depressed if the contract is not awarded to that area, which in turn would propagate the aforementioned horrors, give every person a legitimate claim against the complex*. “The instinct is to think about immediate returns, immediate consequences. (36)”*

The answer does not seem to be in expanding the complex even larger, “Future Shock” in fact warns of the danger in this, but maybe a program with the motives of Apollo is the answer. Is it not possible to set far reaching goals to the future if that is what is required to settle people’s minds? One answer that Toffler suggests is to set up a technological Ombudsman. Some group of knowledgeable persons made up of Scientists, Sociologists etc. to guide us to the future? (37). He also points out the problems with this type of set-up; frantic or fanatical persons in control, political aspirations and local group influence.

Some efforts have been made, but *“ A handful of corporations and government agencies …..have begun to concern themselves with horizons ten, twenty even fifty years in the future. The majority however, remain blindly biased toward next Monday”* (38)

I may not be in complete agreement with Mr. Toffler, but the problem is there. We cannot do without the sociological benefits of Aero-Space Technology, we cannot do without knowing the Who, What, Where, Why and How is man, but allowing local corruption (?) to continue, we will drive ourselves to the alternate solution until someone comes in and replaces OUR values with THEIRS.

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